

Residential Connected Lighting Market

Philip Smallwood

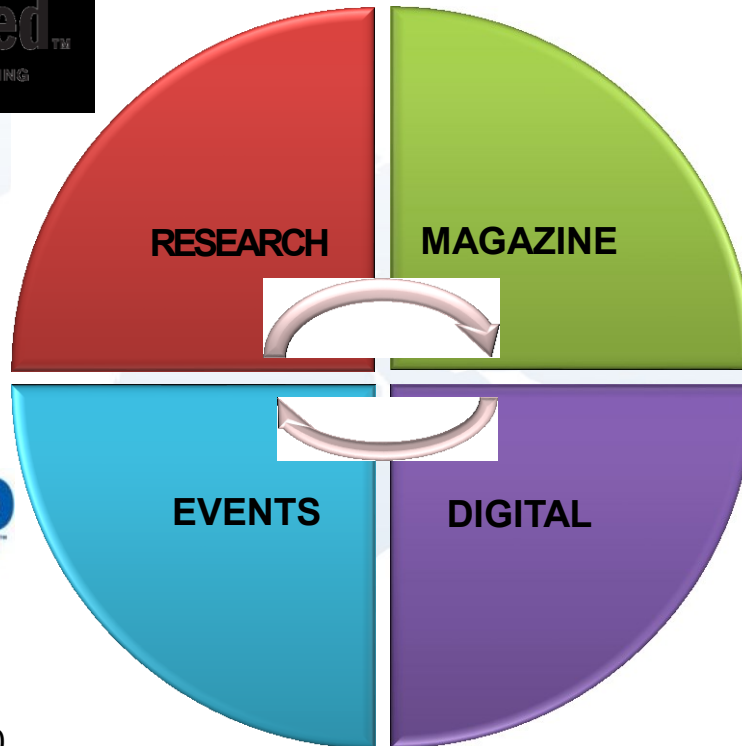
Research Director
Strategies Unlimited

Who is PennWell?



Market Research

World leader in LED, laser and photonics market research and custom Research



- Global circulation 63,800
- 9 issues annually including the Suppliers Directory

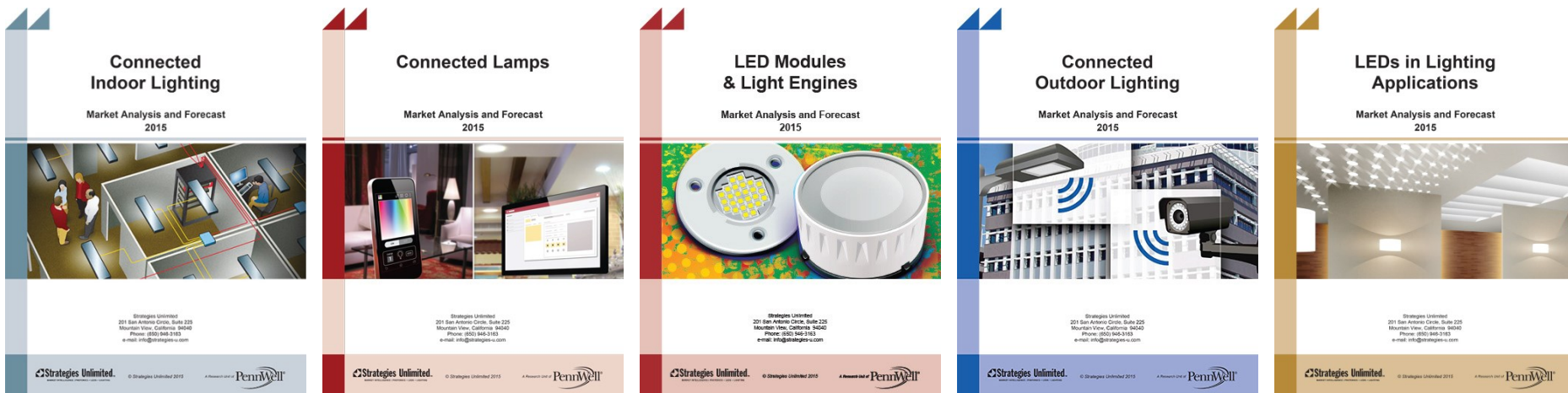


- Page views : 349,667
- Visits: 133,580
- Unique: 82,787



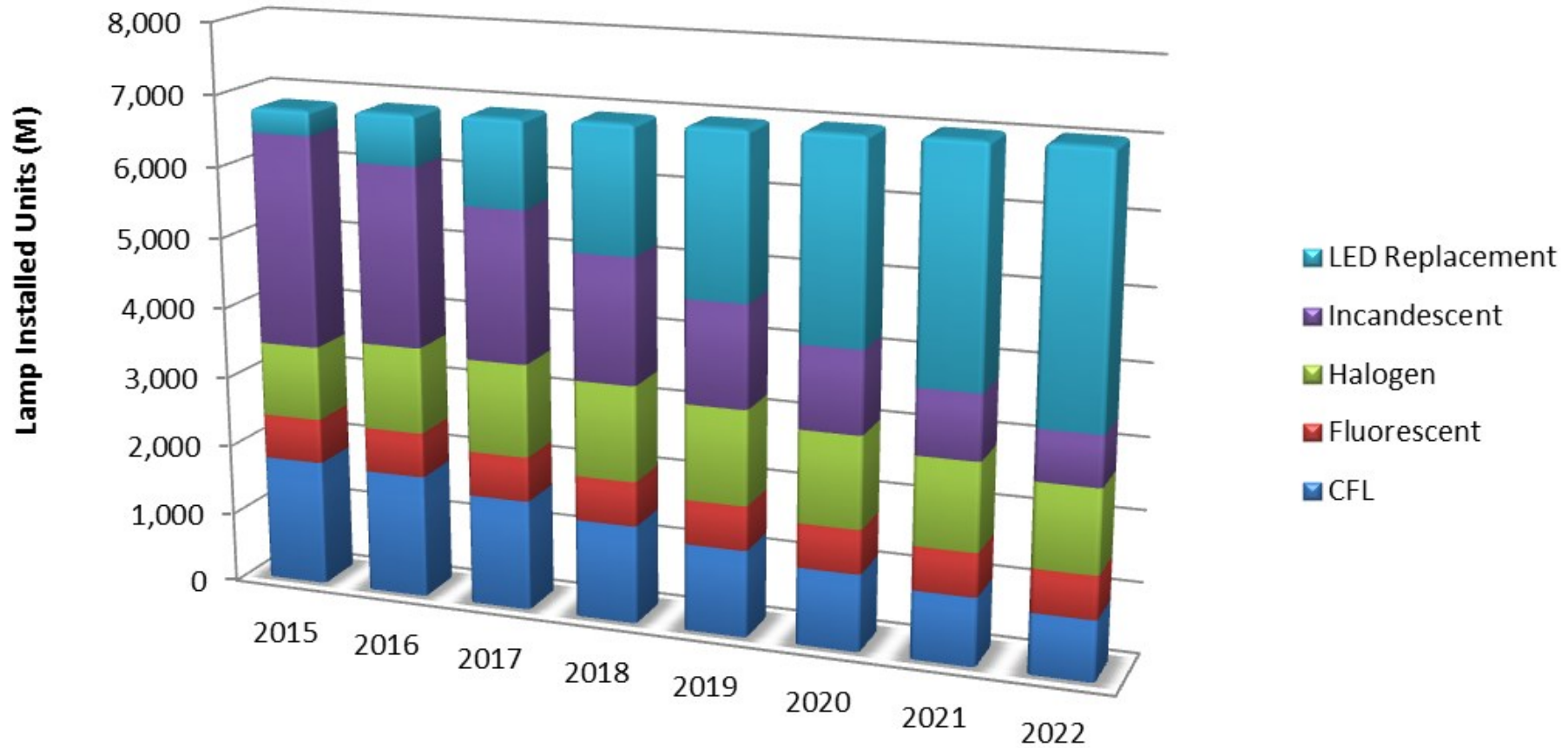
- North America – Nearly 5,000 registrants
- Europe – Nearly 1,000 registrants
- 2,300+ attendees, 90 exhibitors

Reports from Strategies Unlimited

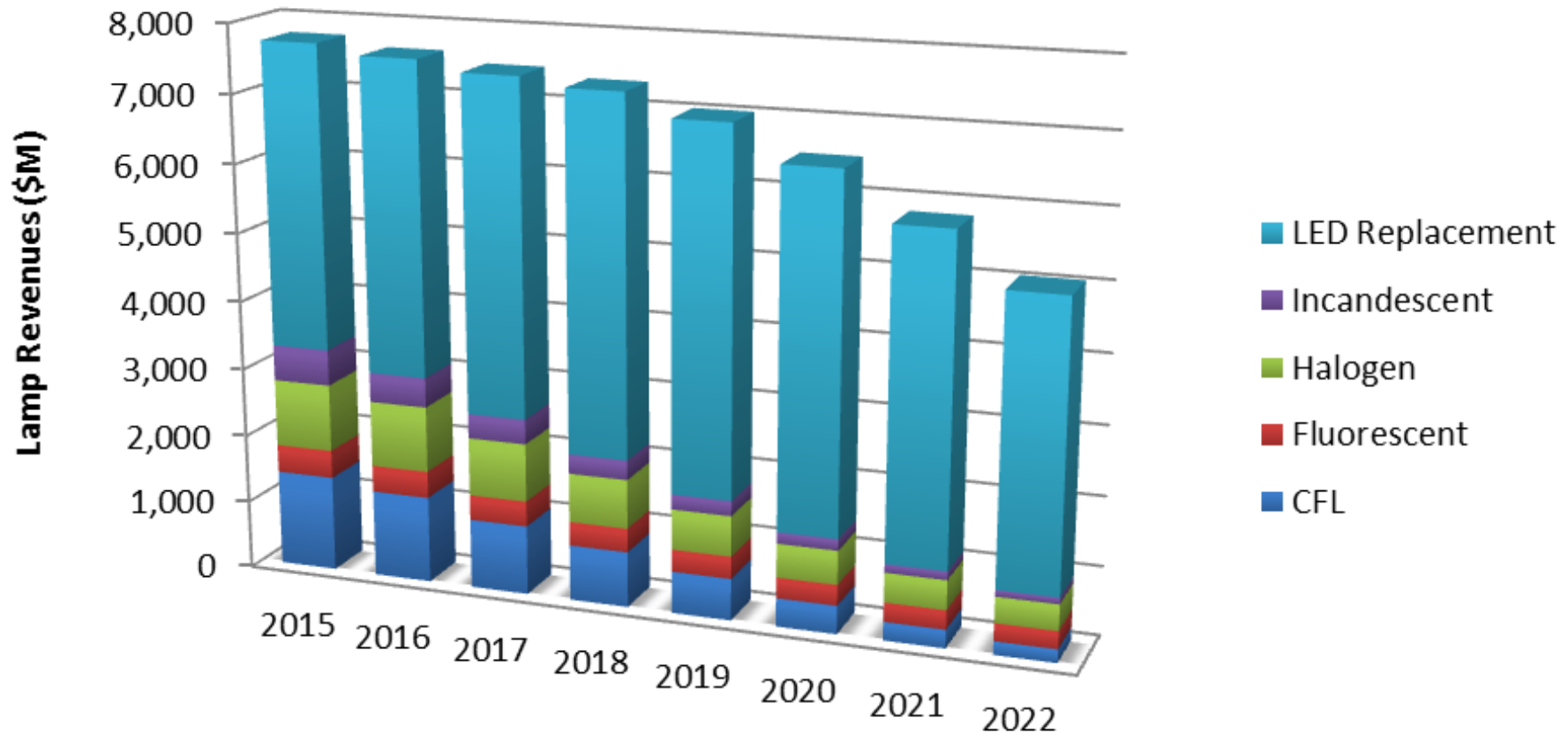


<http://www.strategies-u.com/leds-lighting.html>

North America Residential Lamp Installed Base



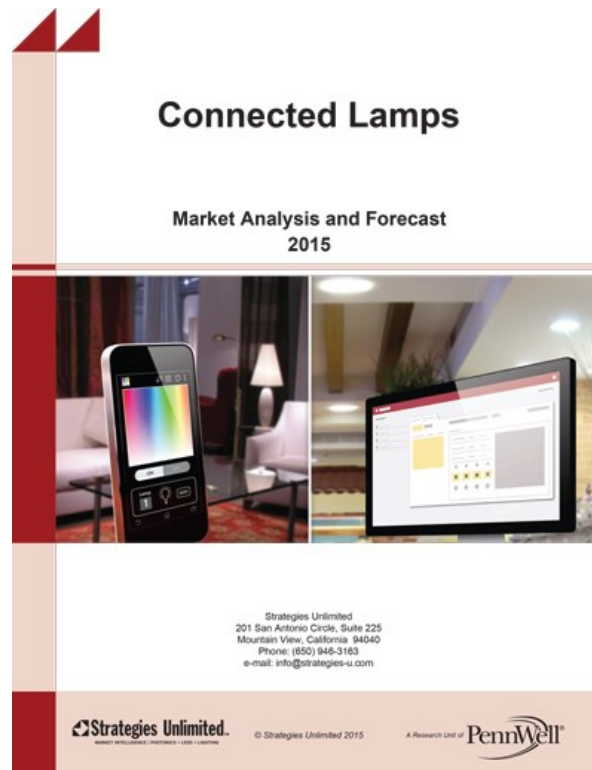
North America Residential Lamp Revenue by Technology



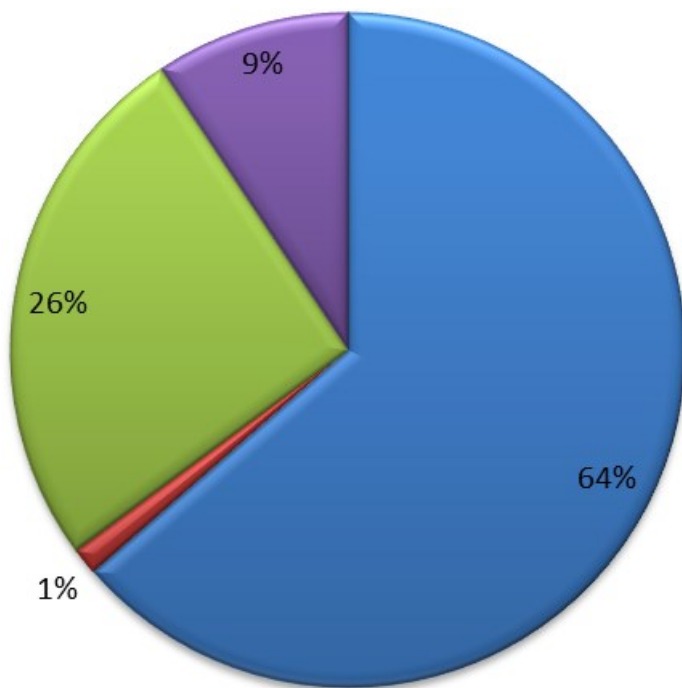
Connected Lighting

Connected LED Reflector & A-Lamps		Connected Outdoor Luminaires		Connected Indoor Controls	
Features	Protocols	Hardware	Protocols	Protocols	
Basic Tunable White	ZigBee	Programmable Scheduling/ Switches	Power Line Communication	Power Line Communication	Bluetooth
Complex Tunable White	Bluetooth	Photocells/ Photo Sensors	ZigBee	Power Over Ethernet	EnOcean
Simple Dimming	Wi-Fi	Occupancy Sensors	6LoWPAN	DALI	Wi-Fi
Color Changing	6LoWPAN	Dimmers	Other 802.15.4 based protocols	ZigBee	Proprietary/ Other
	Hybrid	Hybrid	Proprietary/ Other	6LoWPAN	Hybrid

CONNECTED REFLECTOR AND A-LAMPS



Global Installed Base by Lamp Shape



- Total Installed Base = 6.8 billion lamps
- Reflector and A-lamps comprise 89% of this (19 billion)

Definitions

- **Simple Dimming Connected Lamp** – LED lamps that are wirelessly controlled to dim, with no control over the color temperature or CRI of the light emitted by the lamp.



- **Basic Tunable White Connected Lamp** – LED lamps that are wirelessly controlled to dim using a linear tuning mechanism. Linear tuning products cannot track the blackbody curve (i.e., they cannot maintain a constant Duv as CCT is adjusted).

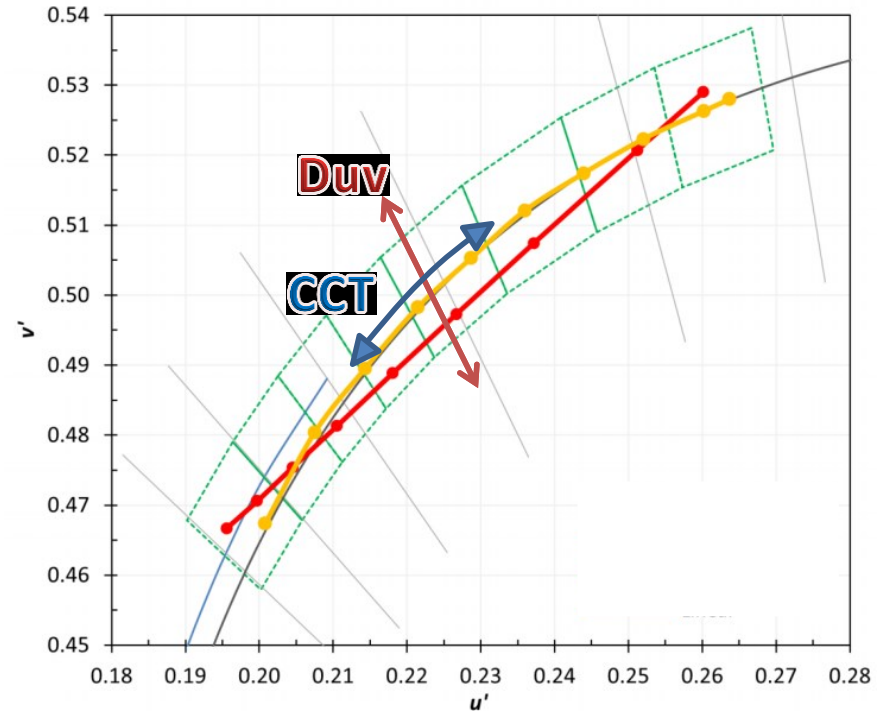
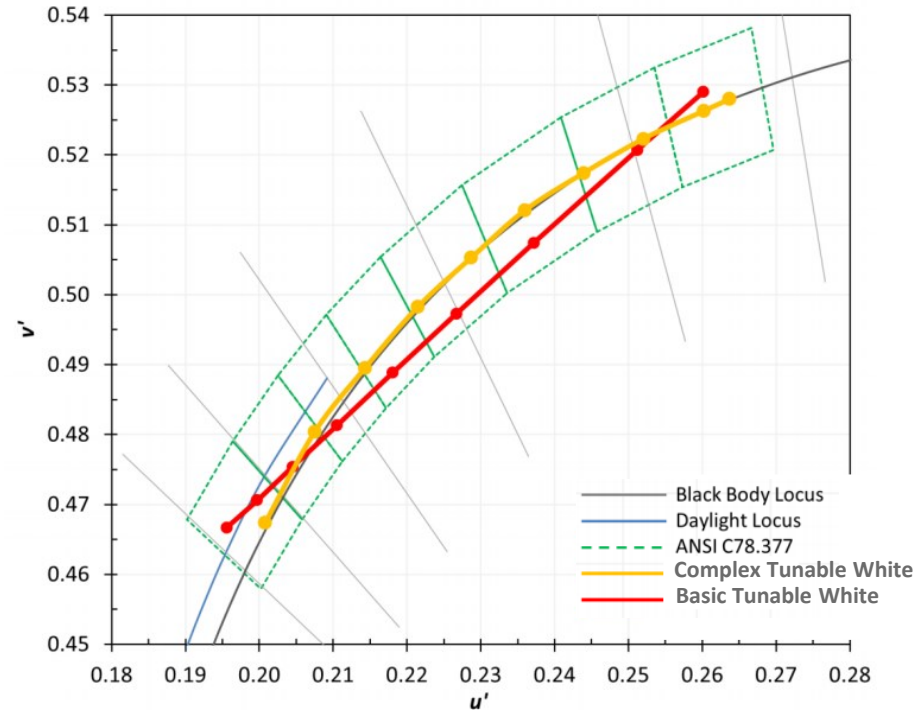


- **Complex Tunable White Connected Lamp** – LED lamps that are wirelessly controlled to dim by using a non-linear mechanism, that are effective at following the blackbody curve. Some products can be adjusted over a range of CCTs and can be dimmed at a constant CCT.

- **Color Tunable Lamp** – Wirelessly controlled LED lamps that can be adjusted to create white or colored light.



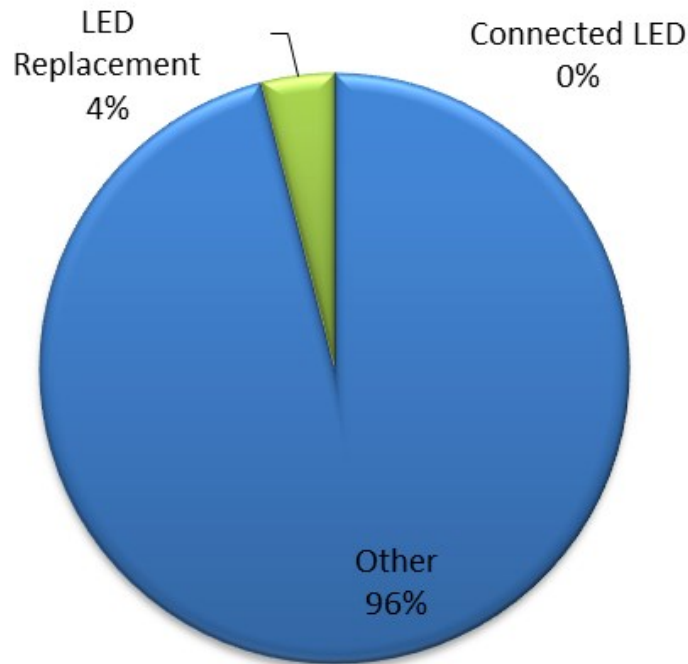
Lamps Features – Black Body Curve



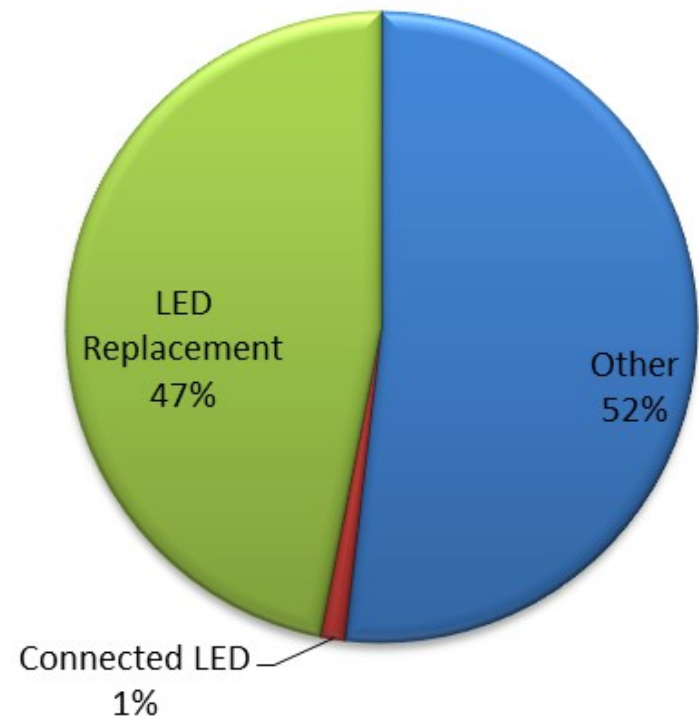
http://energy.gov/sites/prod/files/2015/09/f26/caliper_23_white-tunable-led-luminaires.pdf

Connected LED A and Reflector Lamps Installed Units Residential Forecast

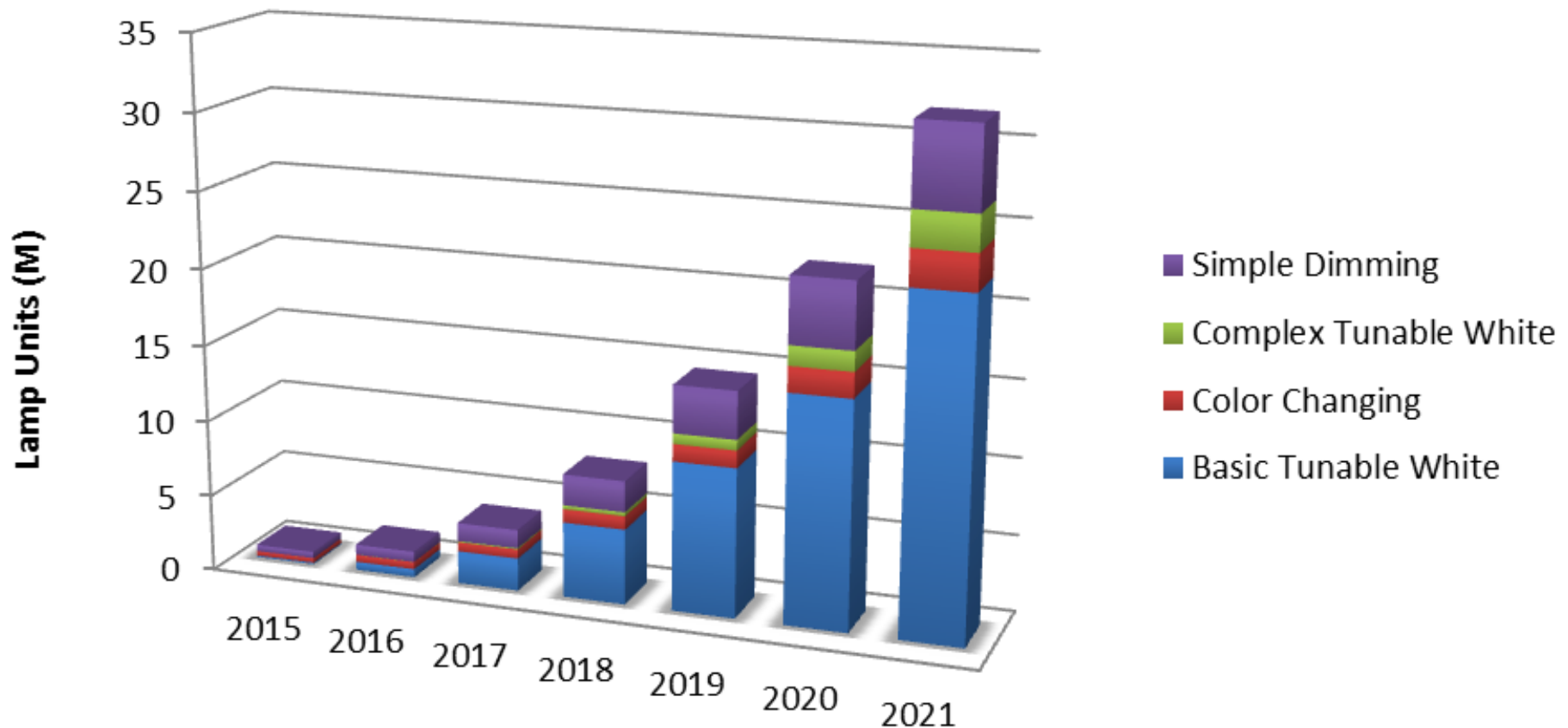
**2015 Total A and Reflector
Installed Base = 6 Billion Units**



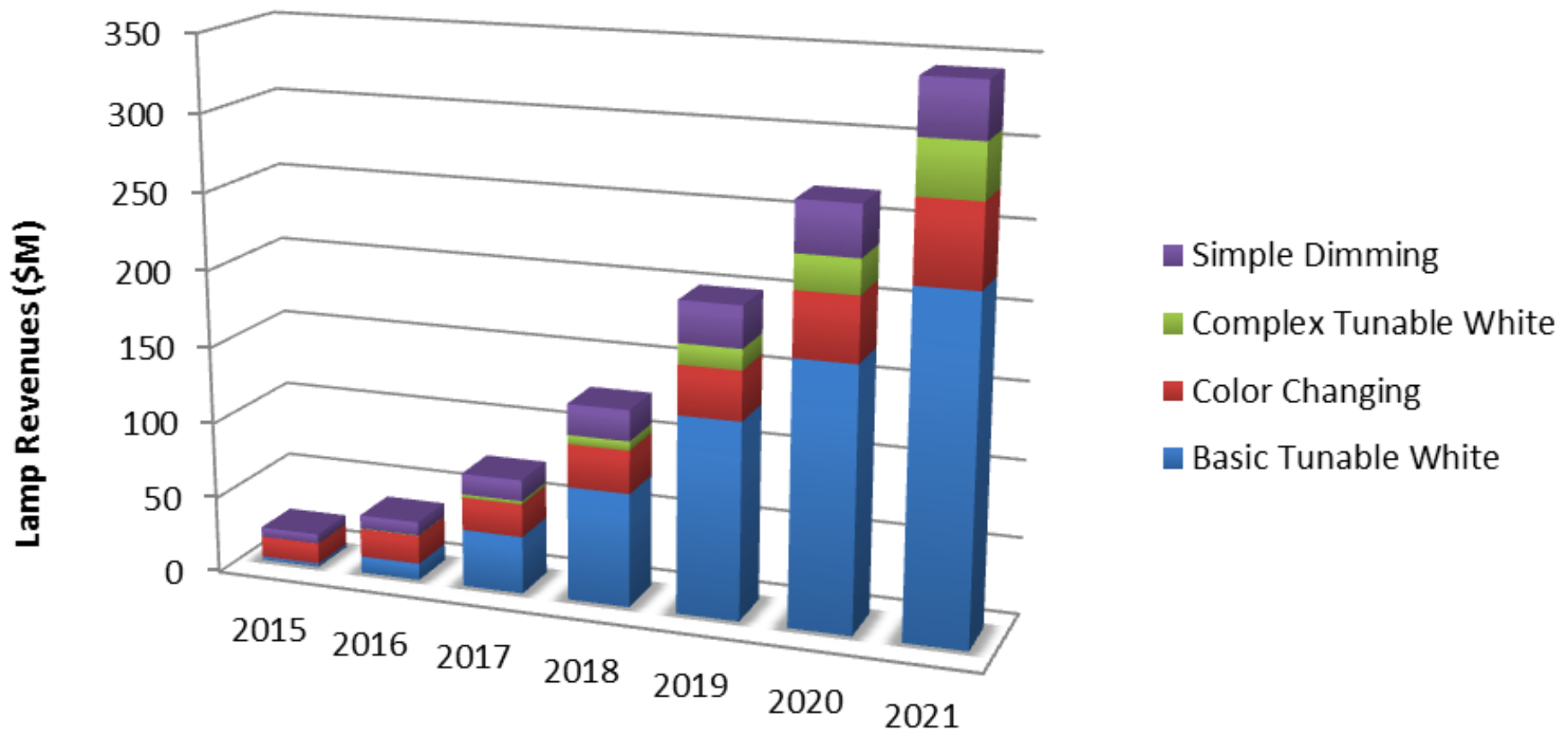
**2021 Total A and Reflector
Installed Base = 6.2 Billion Units**



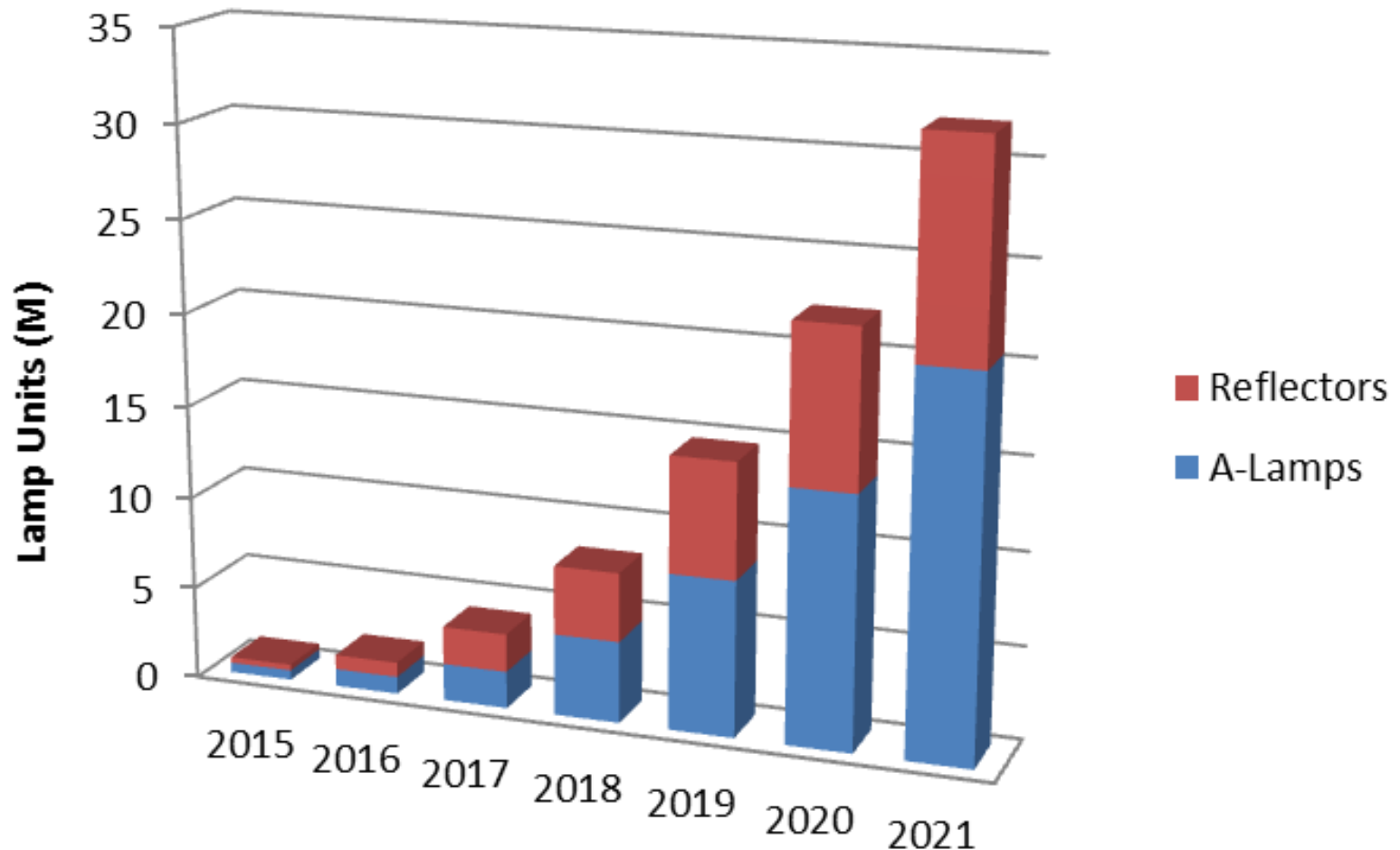
Connected A and Reflector Unit Shipments in Residential by Function



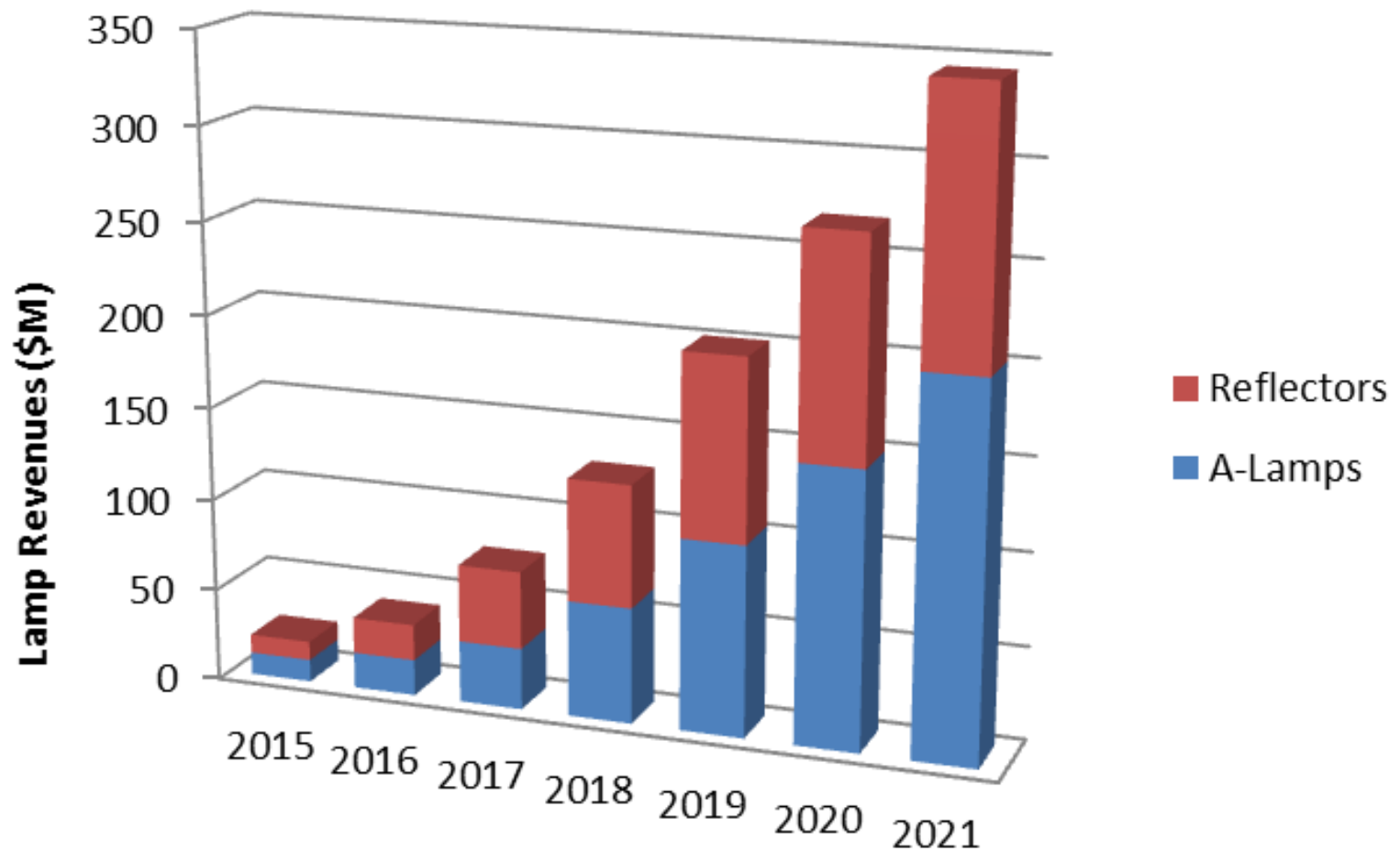
Connected A and Reflector Market in Residential by Function



Connected A and Reflector Unit Shipments in Residential by Shape

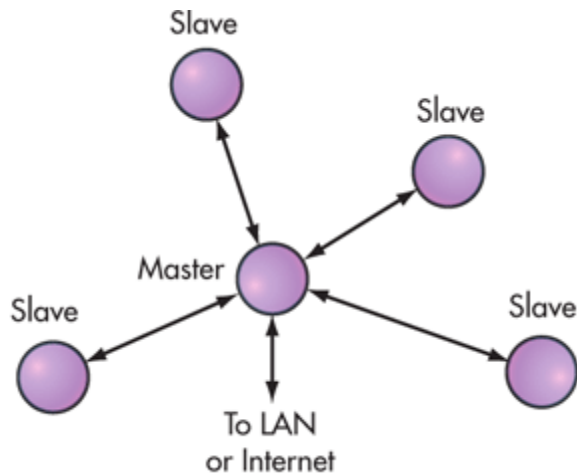


Connected A and Reflector Market in Residential by Shape

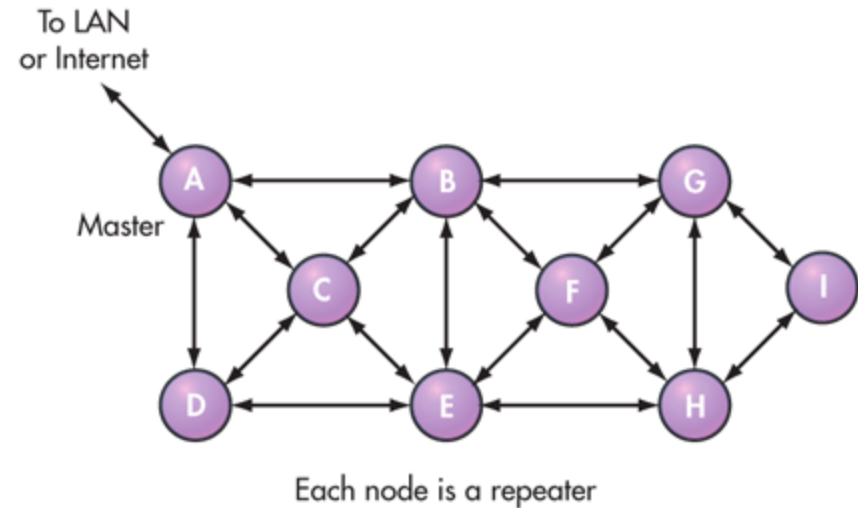


Connected Lighting Topology

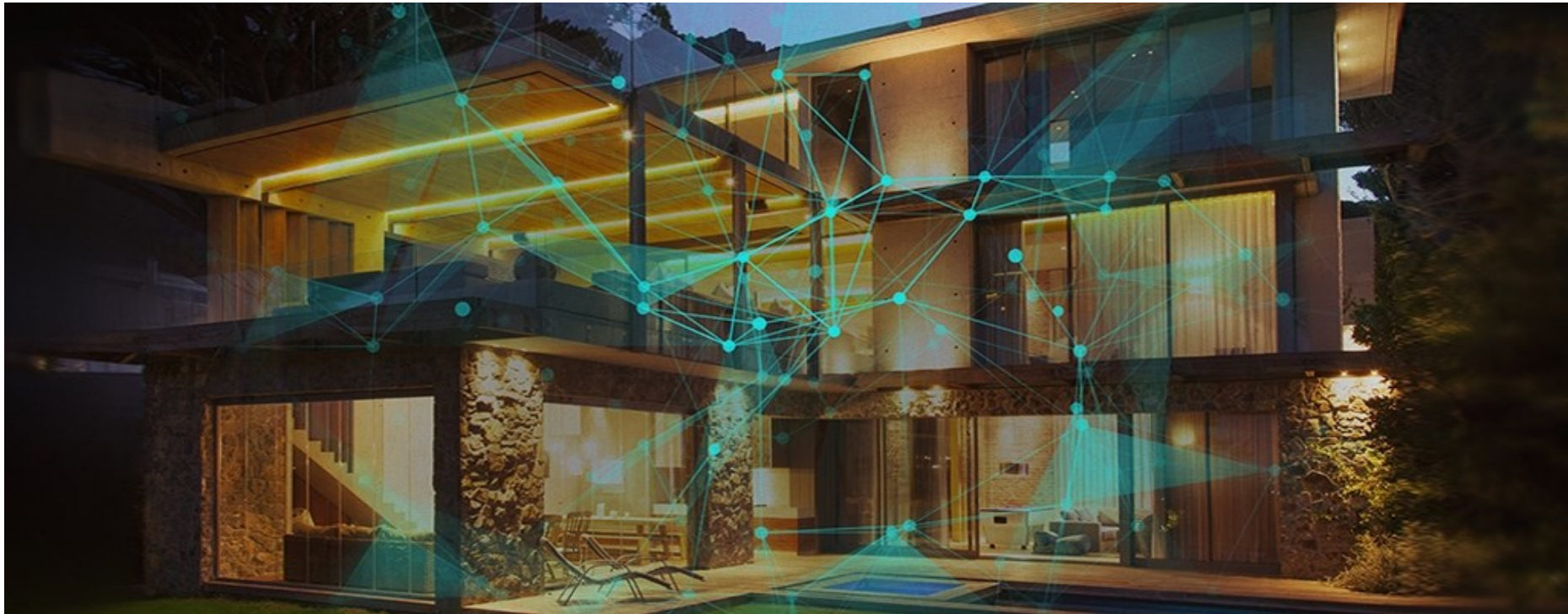
Star Network



Mesh Network



Open Mesh Is Key



<http://www.te.com/usa-en/industries/connected-home/insights/connected-home-iot-takeaways-from-ces2016.html>

Thank You!

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